4.8 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Siting, construction, and operation of facilities for both the long-term storage and disposition of weapons-usable fissile materials at Hanford, NTS, INEL, Pantex, ORR, and SRS, and for disposition facilities evaluated at generic sites would result in some unavoidable environmental impacts. The impact assessment conducted in this PEIS has identified potential impacts, along with mitigation measures that could be implemented to minimize them. The impacts that would remain following mitigation actions are unavoidable; the potential impacts of all alternatives at all sites are discussed below.

Land

At each of the long-term storage analysis sites, up to 87 ha (215 acres) of land would be required during operation of the collocated storage facilities, including necessary supporting infrastructure and access roads. This requirement would represent a maximum of about 2 percent of the total land of any site. Construction and operation of some long-term storage facility alternatives at ORR and SRS would change the VRM classification from Class 4 to Class 5. This change would affect some key viewpoints with high sensitivity levels at ORR.

Under the disposition alternatives, up to 57 ha (141 acres) of land would be required during operation of the deep borehole disposition complex, with necessary supporting infrastructure and access roads. If sited at a generic location, additional land area for a 1.6-km (1-mi) buffer zone could be required. At least 142 ha (350 acres) of land area would be required to operate the evolutionary LWR facilities (for one reactor unit only), including necessary supporting infrastructure and access roads. The potential facility location for the evolutionary LWR at ORR is not within the site boundary. The evolutionary LWR would change the VRM classification of several analyses sites from Class 3 or 4 to Class 5. Other potential actions would change the VRM classification of several analyses sites from Class 4 to Class 5. Cooling towers and other large stacks associated with the disposition facilities would impact visual resources through their physical structure and vapor plumes, which would be visible during certain atmospheric conditions. Construction and operation of some disposition alternatives at ORR would affect key viewpoints with high sensitivity levels.

Site Infrastructure

There would be minor unavoidable impacts anticipated for site infrastructure for long-term storage or disposition activities.

Air Quality and Noise

Air pollutant concentrations would increase slightly or remain the same during construction and operation for long-term storage and disposition activities; however, during construction and operation the sites are expected to be in compliance with Federal, State, and local ambient air quality regulations or standards.

Water

Under the storage alternatives, the maximum amount of groundwater withdrawn would be approximately 190 million l/yr (50.2 million gal/yr) at NTS for the modify P-Tunnel option of the Collocation Alternative. This would represent a 7.9-percent increase over the projected No Action water use, representing 0.5 percent of the minimum estimated recharge.

Under the disposition alternatives, the maximum amount of groundwater withdrawn would be approximately 341 million l/yr (90 million gal/yr) at NTS, INEL, Pantex, and SRS for the evolutionary LWR. At Pantex, the amount of water withdrawal would result in minor drawdowns of the Ogallala Aquifer in the area. Total site groundwater withdrawal would be less than what is currently being withdrawn from the Ogallala Aquifer for industrial use at Pantex.

Geology and Soils

For long-term storage and disposition alternatives, soil erosion resulting from wind and stormwater runoff in disturbed areas would occur.

Biological

For long-term storage and disposition alternatives, federally listed threatened or endangered species, such as the desert tortoise and bald eagle, could be affected directly or by disruptions to foraging, breeding, and nesting habits during construction and operation of facilities. Several candidate or State-listed animal species and special status plant species could also be affected at different sites. While such disruptions may be unavoidable, appropriate measures could be implemented and monitored to ensure that any impacts would not be irreversible. Construction of new facilities would have some unavoidable impacts on animal populations. Larger animals and birds would move to similar habitats nearby if the habitats could sustain them, while less mobile animals within the disturbed areas, such as amphibians, reptiles, and small mammals, would not be expected to survive.

Clearing and grading operations could result in the direct loss of wetlands, although proper placement of the facility within the overall site would eliminate or reduce the potential for such loss. Where direct loss is unavoidable, mitigation measures would be developed.

Cultural Resources

Some NRHP-eligible prehistoric and historic resources may exist within the area to be disturbed at any potential long-term storage or disposition site. The appropriate SHPO and the Advisory Council on Historic Preservation would be consulted to minimize unavoidable impacts. Native American resources could be unavoidably affected by land disturbance, audio or visual intrusions on Native American sacred sites, or by reduced access to traditional use areas, or theft or vandalism. DOE would consult with the affected tribes to minimize any impacts. Paleontological resources could exist within acreage disturbed during construction of facilities. Construction activities would be monitored by a paleontologist to minimize any impacts to scientifically important paleontological materials.

Socioeconomics

Construction and operation of the long-term storage and disposition facilities at some sites could lead to increases in regional population, which would have an impact on the surrounding jurisdictions. For some alternatives, the additional population would increase the demand for community services including education, public safety, and health care. However, at none of the sites analyzed would the increase in demand exceed the capacity of the affected communities to provide these services. Implementing these proposed alternatives would increase traffic on the roads leading into some of the sites analyzed. The resulting increases in traffic congestion and accidents would be unavoidable and could require upgrading the affected roads to accommodate increase traffic and minimize accidents.

Public Safety and Health

During the normal operation of any of the storage facilities, there would be radiological releases to the environment and to workers. The largest increase in radiation dose to the MEI from annual storage operations would result from the collocated storage facilities at ORR. The dose to the MEI would be 4.5×10^{-5} mrem/yr and the associated risk of fatal cancer from the 50 year period of storage operations would be 1.1×10^{-9}. This same new facility operating at ORR would also result in the largest increase in dose to the population within 80 km (50 mi) of any site from annual storage operations. The dose to the ORR populations would be 8.7×10^{-4} person-rem/yr; in 50 years of storage operations, 2.2×10^{-5} excess fatal cancers could occur in this population. The largest increase in dose to the involved workforce from annual new storage operations would

result from operation of the modified FMEF Pu storage facility at Hanford. The dose to this workforce would be 52 person-rem/yr; in 50 years of storage operations, one fatal cancer could occur in the workforce.

Hazardous and toxic chemicals would be present during construction and operation of the long-term storage facilities. Worker exposure to these chemicals would be unavoidable. The HI from the facility to the MEI for collocation at Pantex would be 2.0×10^{-4} and for collocation at ORR the cancer risk would be 1.6×10^{-7}. The HI from the facility to the onsite worker for collocation at INEL would be 1.9×10^{-3} and for modifying the P-Tunnel for consolidation or collocation at NTS the cancer risk would be 6.4×10^{-6}.

During the normal operation of any of the disposition facilities, there could also be radiological releases to the environment and to workers. The largest increase in radiation dose to the MEI from annual disposition operations would result from the operation of the evolutionary LWR at ORR. The dose to the MEI from a single evolutionary LWR would be 4.9 mrem/yr, and the associated risk of fatal cancer from the projected 17-year period of reactor operation would be 4.1×10^{-5}. The largest increase in dose to the population within 80 km (50 mi) of any site from annual disposition operations would be 32 person-rem from operation of a large evolutionary LWR at SRS; in the 17-year operational period, 0.27 excess fatal cancers could occur in this population from total site operations. The largest increase in annual dose to the workers from disposition operations would result from operation of the partially completed LWR. The dose to the involved workforce would be 380 person-rem/yr; in the projected 17-year period of operation of this reactor, 2.5 excess fatal cancers could result in the workforce.

Hazardous and toxic chemicals would be present during construction and operation of the disposition facilities. Worker exposure to these chemicals would be unavoidable. The HI from the ceramic immobilization facility to the MEI for the Ceramic Immobilization Alternative at Pantex and ORR would be 1.5×10^{-2} and the cancer risk for the Pu conversion facility at ORR would be 1.9×10^{-7}. The HI from the deep borehole complex to the onsite worker for the Direct Disposition Alternative would be 0.29 and the cancer risk for the Pu conversion facility at ORR would be 1.5×10^{-5}.

Waste Management

Construction and operation of long-term storage facilities would affect existing waste management activities by increasing the generation of TRU, low-level, mixed, hazardous, and nonhazardous wastes. Increased hazardous wastes would require additional shipments to RCRA-permitted treatment and disposal facilities. Increased TRU waste would require new or expanded above-grade storage facilities and additional shipments to WIPP (depending on decisions made in the ROD associated with the supplemental EIS being prepared for the continued phased development of WIPP for disposal of TRU waste). The increased LLW for the Consolidation or Collocation Alternatives could require additional engineered trenches or vaults at some candidate sites. Generation of additional nonhazardous wastes could require the expansion of existing or construction of new liquid and solid waste treatment facilities, or could reduce the lifetimes of existing solid waste landfills.

Construction and operation of disposition facilities would affect existing waste management activities by increasing or initiating the generation of spent nuclear fuel for the reactor alternatives, and increasing the generation of TRU, low-level, mixed, hazardous, and nonhazardous wastes for all disposition facilities with the exception of the existing LWR site. The deep borehole complex would require the construction of waste treatment and storage facilities. Construction of new or expansion of existing spent fuel storage facilities would be required at all sites for the reactor alternatives. Increased TRU waste would require new or expanded radwaste treatment facilities and above-grade storage facilities at some sites. Additional shipments to WIPP (depending on decisions made in the ROD associated with the supplemental EIS being prepared for the continued phased development of WIPP for disposal of TRU waste) would be required at all sites. Increased LLW would require additional LLW shipments from Pantex to NTS (assuming Pantex would continue the current practice of shipping LLW to NTS) and could require additional engineered trenches or vaults at some candidate sites. Increased mixed waste could require expansion of treatment capability developed at each of the

sites as reflected in the individual site treatment plans which were developed to comply with the *Federal Facility Compliance Act*. Additional or expanded RCRA-permitted staging or storage areas would be required at the generic MOX facility and some of the representative sites. Construction of new or expansion of existing sanitary, utility, and process wastewater treatment systems would be required for alternatives where the increase waste stream volumes exceed the capacity. For those sites that would discharge to a publicly-owned treatment works, such as the partially completed LWR, expansion of pretreatment systems may be required. Generation of additional solid nonhazardous wastes could reduce the expected lifetimes of current solid waste landfills.

Transportation

Existing facilities would be used for continued storage, which is the baseline case to which the transportation impacts for other alternatives is compared. Under No Action for storage and disposition, there would be no transportation of materials, and thus no transportation risks incurred. For storage, the maximum total potential fatalities from the transportation of Pu and HEU would be 1.070 for the Collocation Alternative at Hanford. For disposition, the maximum total potential fatalities from the transportation of surplus Pu would be 5.65 for the Existing LWR, Partially Completed LWR, and Evolutionary LWR Alternatives.